



Office of
**Air Quality Planning
and Standards**

**Air Toxics
Monitoring**

**Visibility -
IMPROVE &
Regional Haze**

**Ozone -
PAMS**

**Fine Particles
PM_{2.5} Mass
&
Chemical Speciation**

**Inhalable Particles -
PM₁₀**

**AIRNOW -
AQI &
Forecasts**

**Acid Deposition -
CASTNet**

National Ambient Air Monitoring Strategy

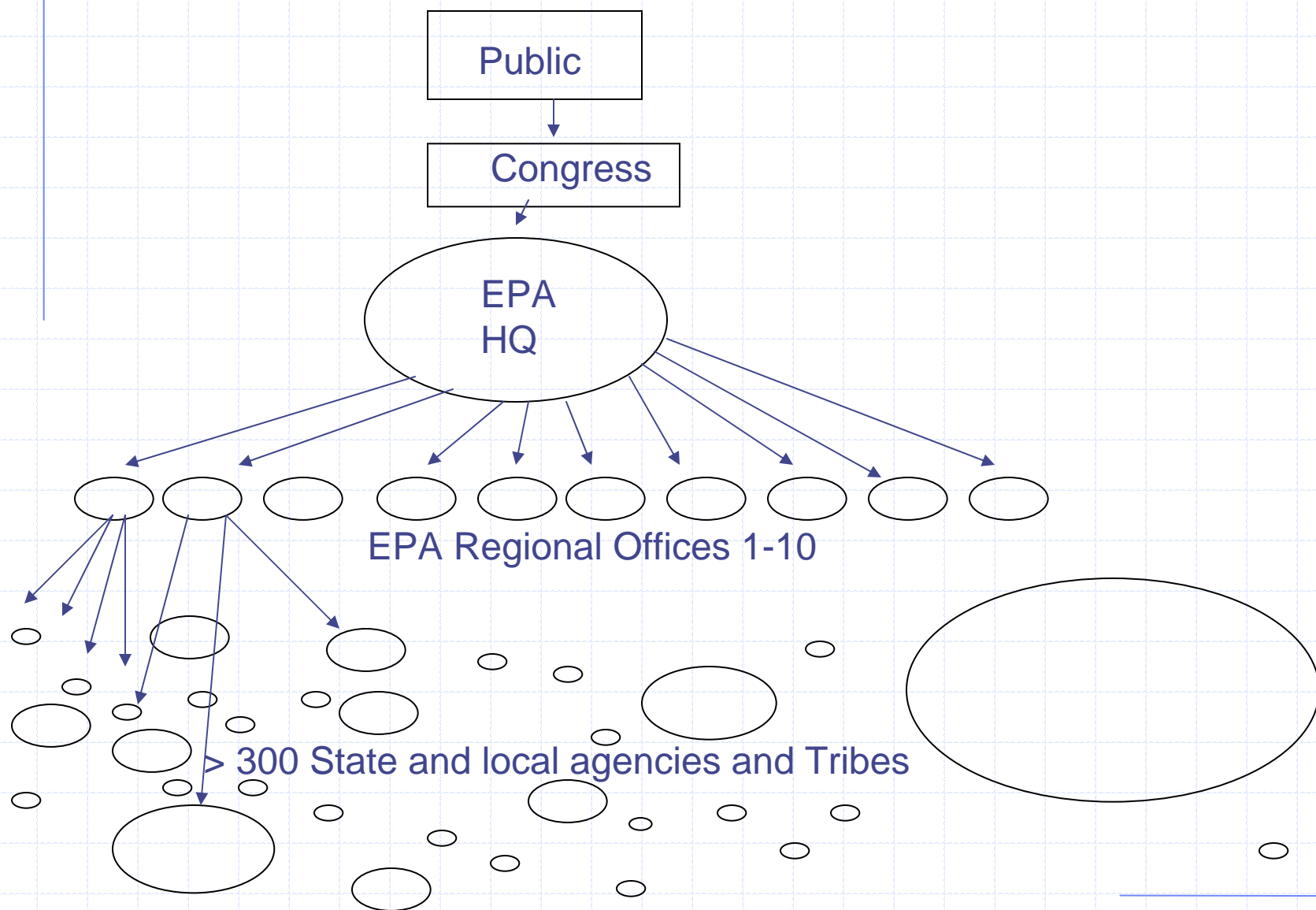
A Comprehensive Re-
Examination and Re-
configuration of Air Monitoring
Networks

July 2003

Agenda

- ◆ Background/Backdrop
- ◆ Background..strategy
- ◆ Network assessments
- ◆ NCORE/design
- ◆ Issues/schedule

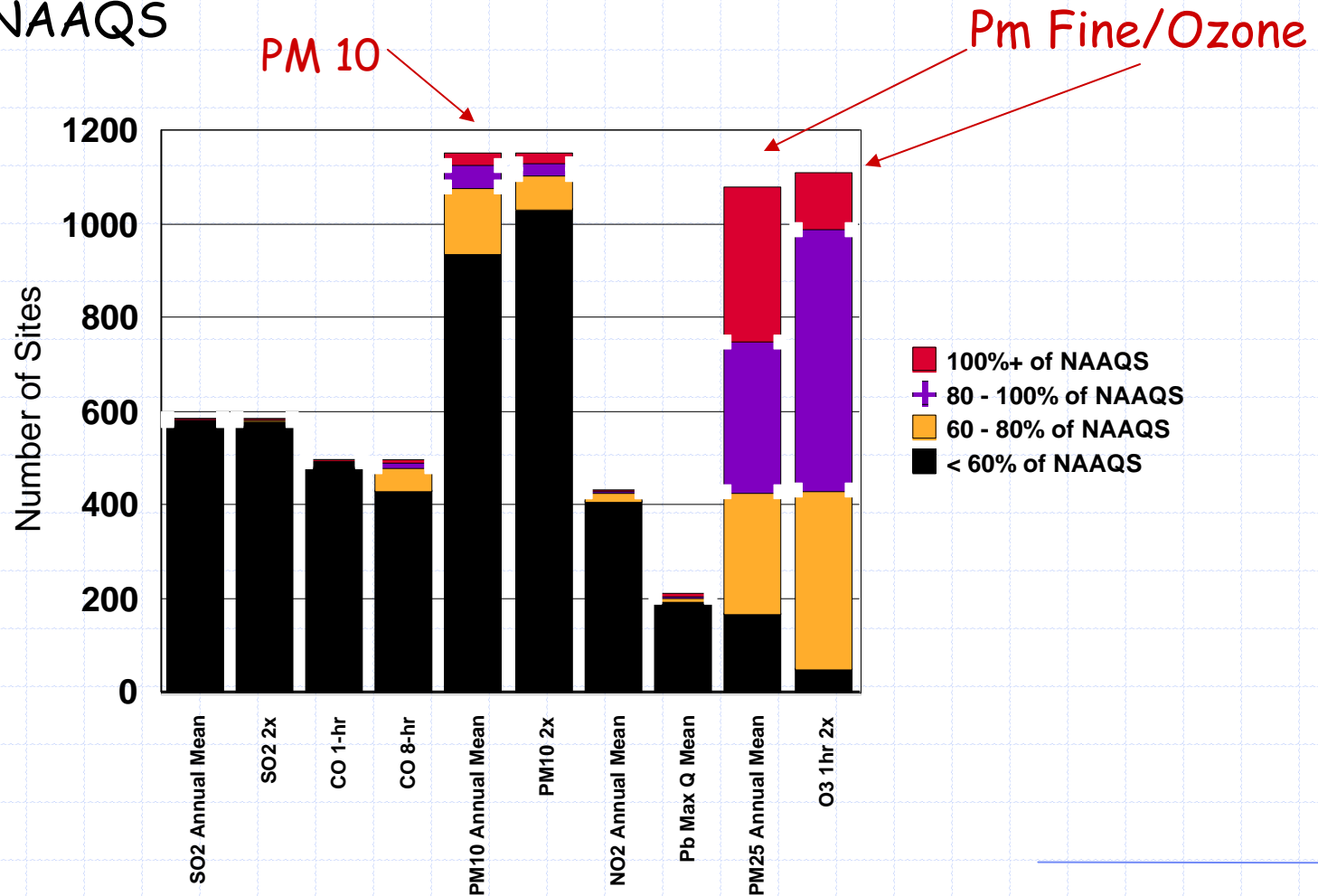
Monitoring Program...Administration process...resource flow



Why Do We Need a New Strategy?

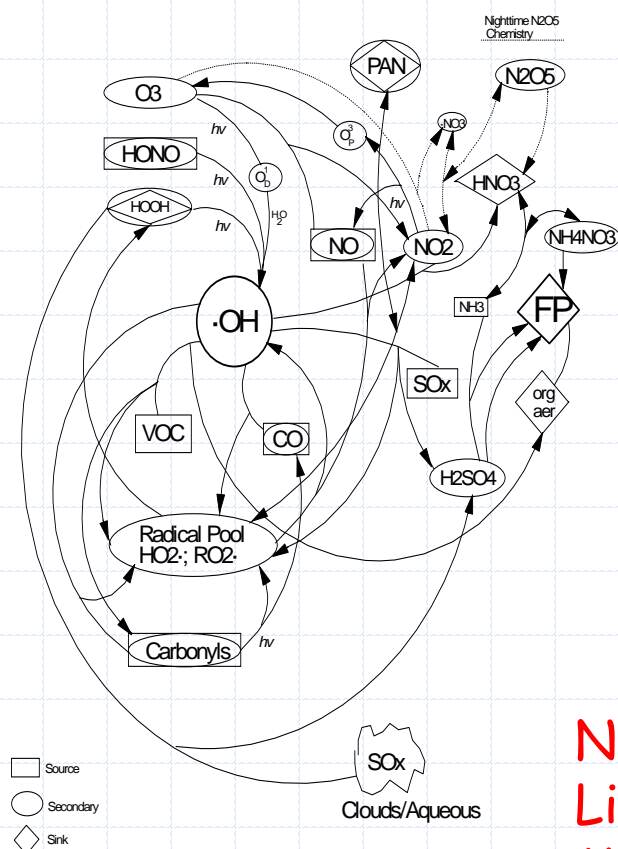
Common sense initiative

Most criteria measurements (except O3, PM2.5) well
Below NAAQS

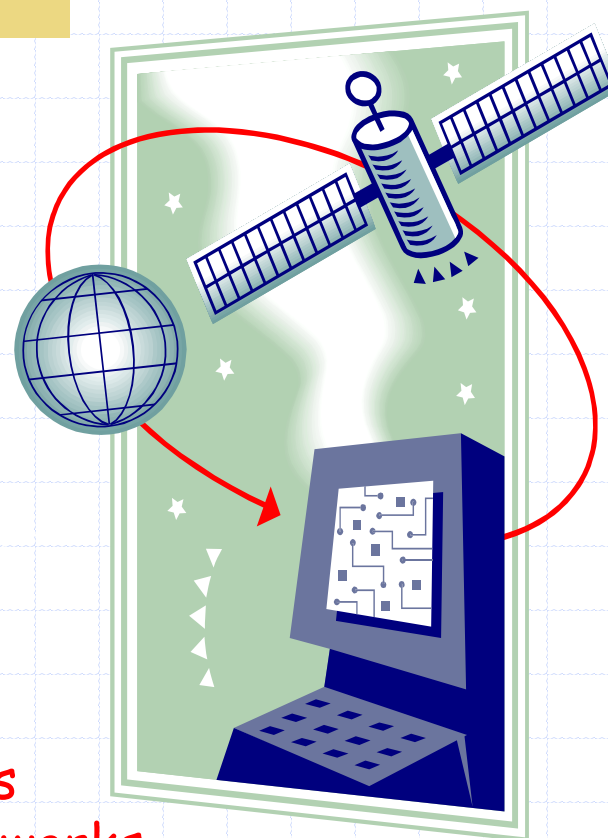


Why Do We Need a New Strategy ?

Progress in science and technology to address this complex work.



New Monitors
Linked to networks
Models & data systems

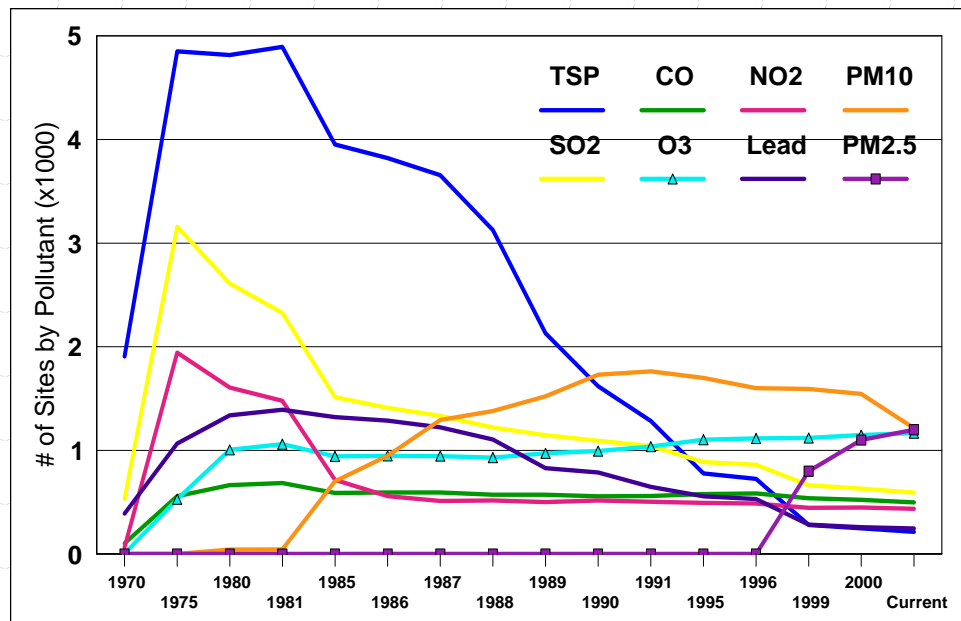


Principal Recommendations

- ◆ Need insightful measurements to ensure the \$\$\$ allocated for emission reductions are effective.
 - Enhanced real-time data delivery to public
 - Increase capacity for hazardous air pollutant measurements
 - ◆ Future predictions suggest air toxics pose collectively greater risks than criteria pollutants
 - Increase in continuous PM measurements
 - Support for research grade/technology transfer sites
- ◆ Multiple pollutant monitoring must be advanced
 - Air quality is integrated through atmospheric processes, health/eco effects, emission sources.
- ◆ Technological advances must be incorporated
 - Information transfer technologies
 - Continuous PM monitors
 - High sensitivity instruments to address today's (and later) low levels
 - Model-monitor integration must advance to effect benefits for both tools

Principal Recommendations

- ◆ Reallocate monitoring resources from “low-value” criteria measurements to new priorities (HAPS, Fine Particles, etc).
 - Level of realignments
 - ◆ *Minor (O₃, PM_{2.5}) ...Create a sustainable network*
 - ◆ *Substantial (PM₁₀, NO₂, CO, SO₂)...focus on real environmental benefit.*



**Network
Evolution
1970-2001**

Principal Recommendations

- ◆ Revise National monitoring networks through NCore
 - Emphasis on multi-pollutant monitoring, continuous and information transfer technologies
 - Modest initial \$ required to catalyze change
- ◆ Ensure stability and flexibility for States, local agencies and Tribes
- ◆ Modify monitoring regulations to facilitate change

Key principles

◆ Partnership...now with Grantees (States, locals, Tribes)

- Oversight through the National Monitoring Steering Committee (NMSC)
- Expansion to other agencies, private sector sponsored studies

◆ Balance between national and local needs

- Increase/maintain flexibility for S/L/Ts
- Ensure capable of addressing national level needs

◆ Near “zero” sum assumption in resources

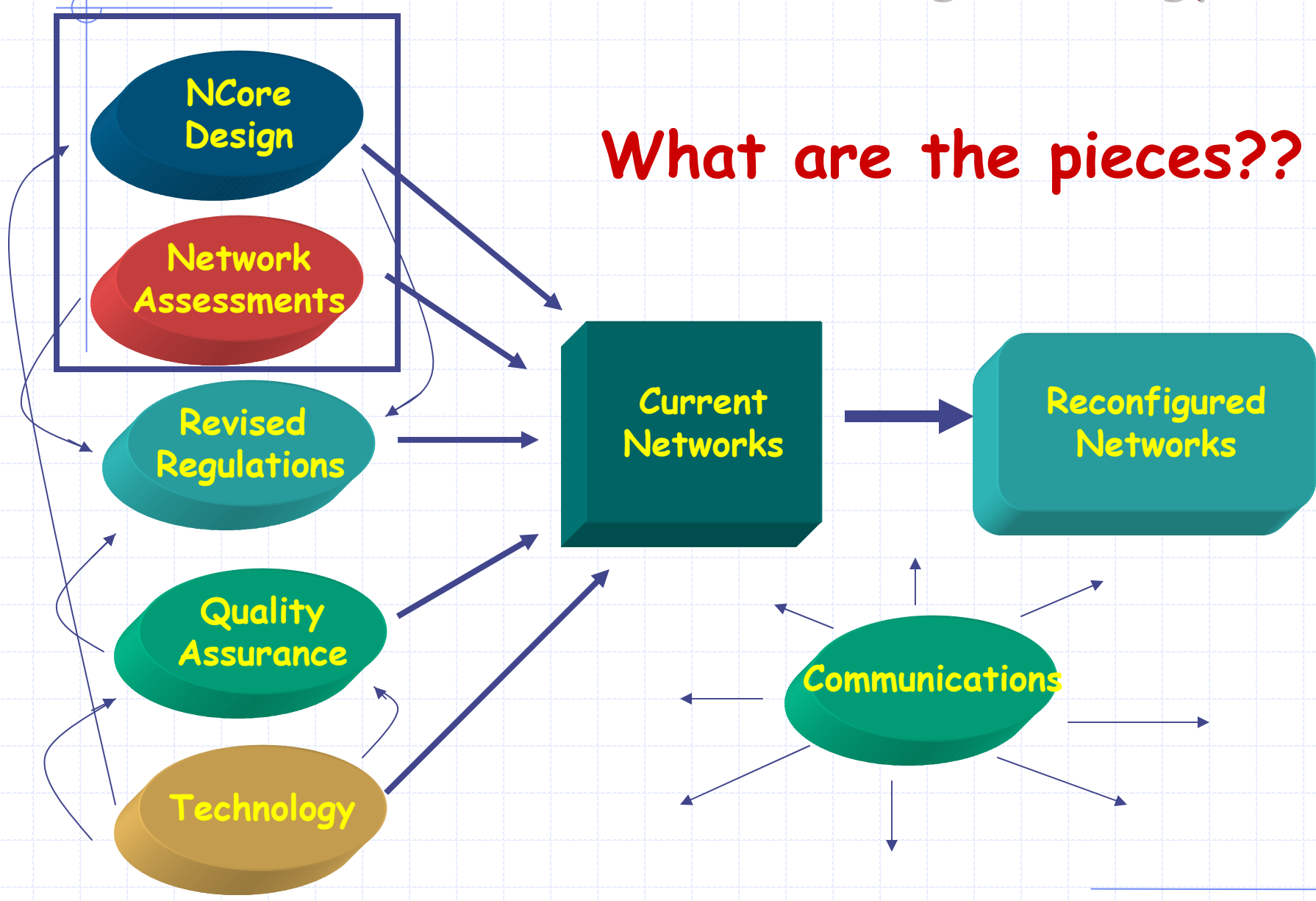
- Maintain long term viability of monitoring agencies
- Near term-work within current resource framework

How & Who does this benefit?

- ◆ **State and local agencies**
 - More focused operations, increase relevancy and flexibility and products
- ◆ **Tribes**
 - Provides integration/partnering opportunities
- ◆ **Public**
 - Faster and more comprehensive data delivery creates a more informed public
- ◆ **EPA**
 - Stability/consistency in data for major national programs
- ◆ **Science community**
 - Enhanced integration with national networks
 - Increase in continuous and multi-pollutants data sets
- ◆ **Other agencies and organizations**
 - Commonality in data needs...
 - ◆ Fosters efficient networks and use of data

National Ambient Air Monitoring Strategy

What are the pieces??

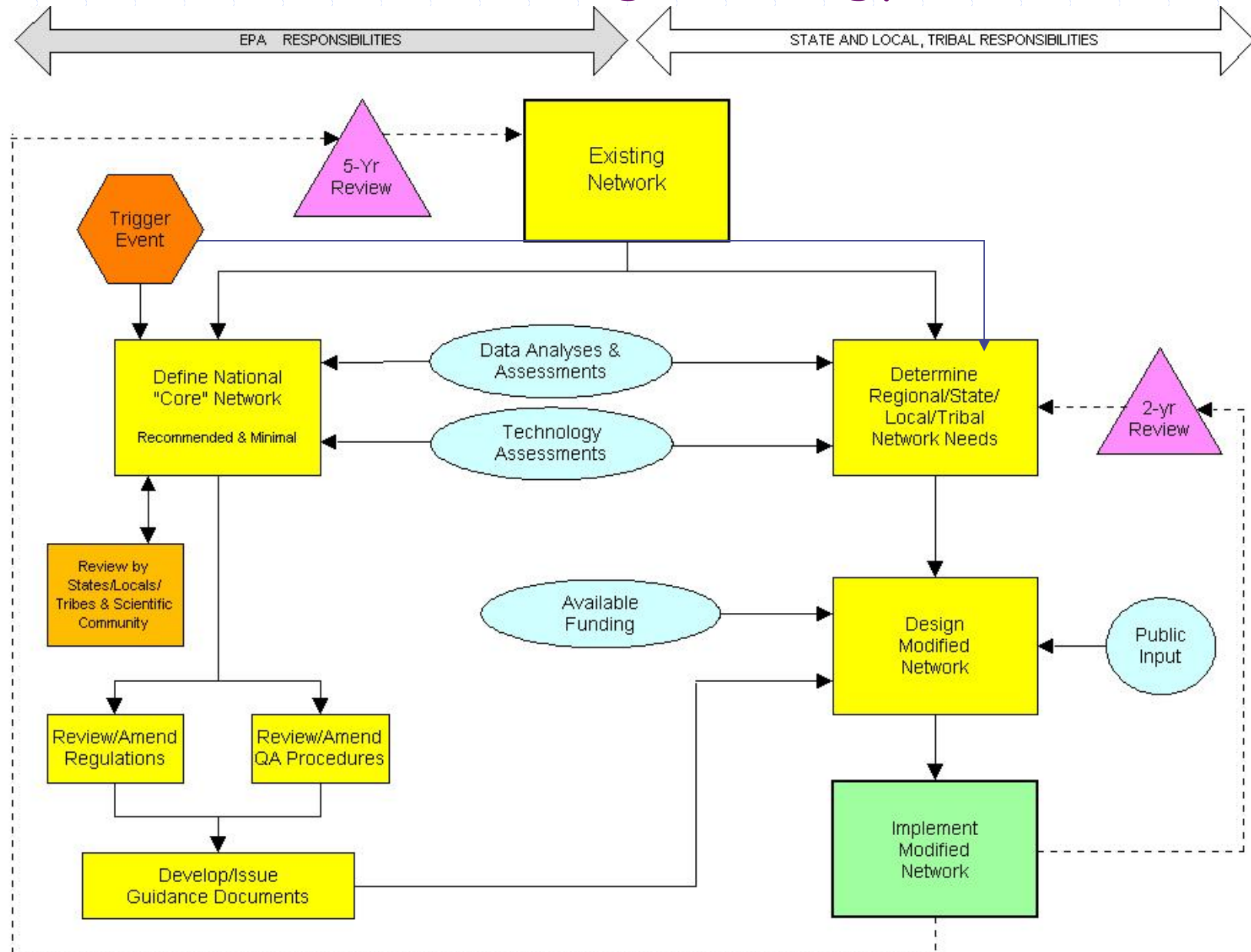


Workgroup structure

- ◆ **National Monitoring Strategy Committee**
 - ~ 15 reps for EPA, States, local agencies and Tribes
 - Consensus, strategy formulation, strategy approval

- ◆ **Three technical workgroups**
 - Address more substantive implementation elements
 - Regulations
 - QA
 - Technology

Dynamic interactions among Strategy elements

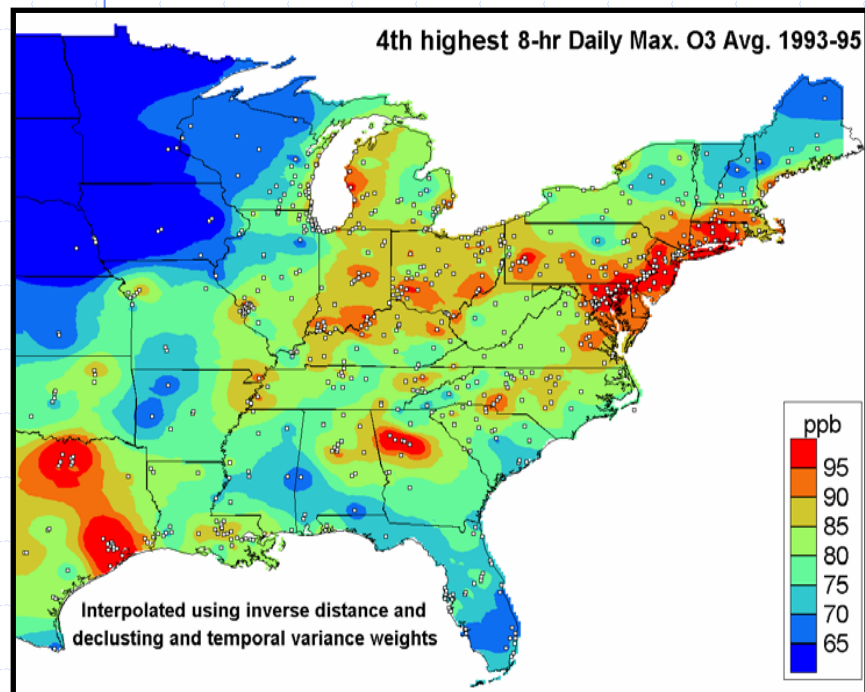


Network Assessments

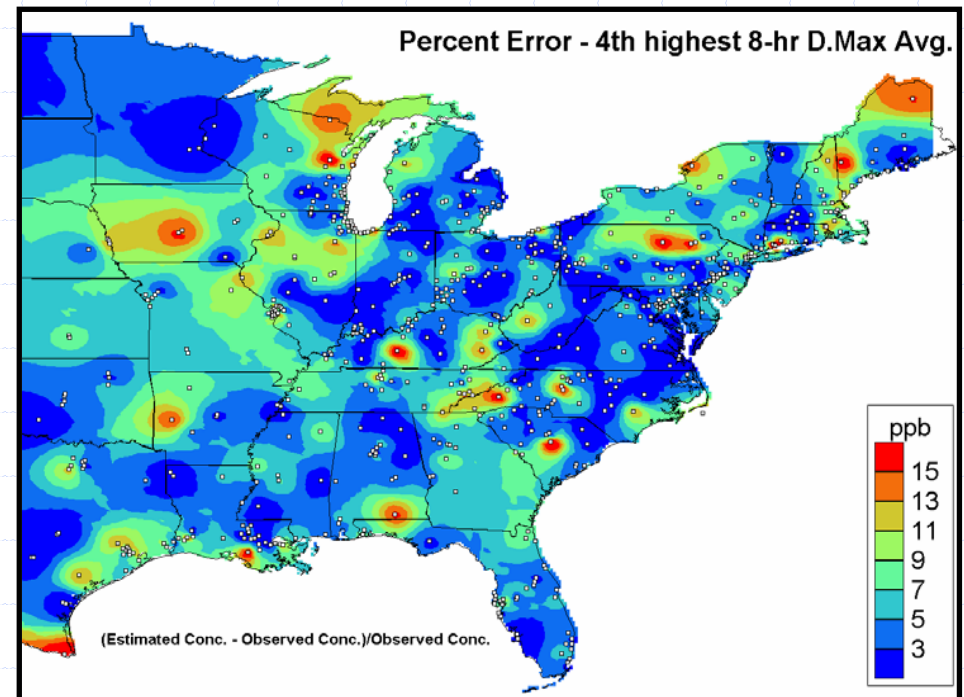
- ◆ **Emphasis on value of current networks**
 - Identify redundancy, low “value” monitors
- ◆ **Initial National Assessment**
 - Catalyze more specific regional work
 - Provide a “reference” and data source
- ◆ **Regional level assessments**
 - Determine actual network modifications...
 - Beyond “network reviews”
 - Region 5/LADCO.....model example
 - Workshop...9/03...Region 4
 - Iterative....

National Assessments examples

Reference or base case concentrations



Identifies areas of site abundance & paucity



Summary of National Assessment Results



Ozone

- **Limited Reductions Nationally (5 - 30%)** With an Emphasis on Relocation to Enhance Mapping, Rural/Regional Concentrations, Possible Increases to Assist in Coverage in Southeast and Texas, investment in air toxics.



PM_{2.5} FRM

- **Moderate Reductions (20-30% to ~ 800 Sites)** "After designations" Coinciding With a Shift to Continuous Methods for AQI/Mapping; Eventual 500 Site (or Smaller) Network Following Successful Demonstration of Cont. Methods



PM₁₀

- **Major Reductions** From 1600 Site Network (1996) Dependent on Regional/State Rqmts; resource shift toward PM_(10-2.5).

Summary of National Assessment Results (Cont)



CO, NO₂, SO₂

- **Major Reductions** for NAAQS Purposes; Switch to Representative and High Sensitivity Techniques for Model Evaluation, Build Into New Core Sites, investment in air toxics



Lead

- Declare Victory!....Minimal Trends...emphasis as a HAP Metal



PAMS

- Restructure. Reduce "Minimum" Requirements.



Regional/local assessments due March/03

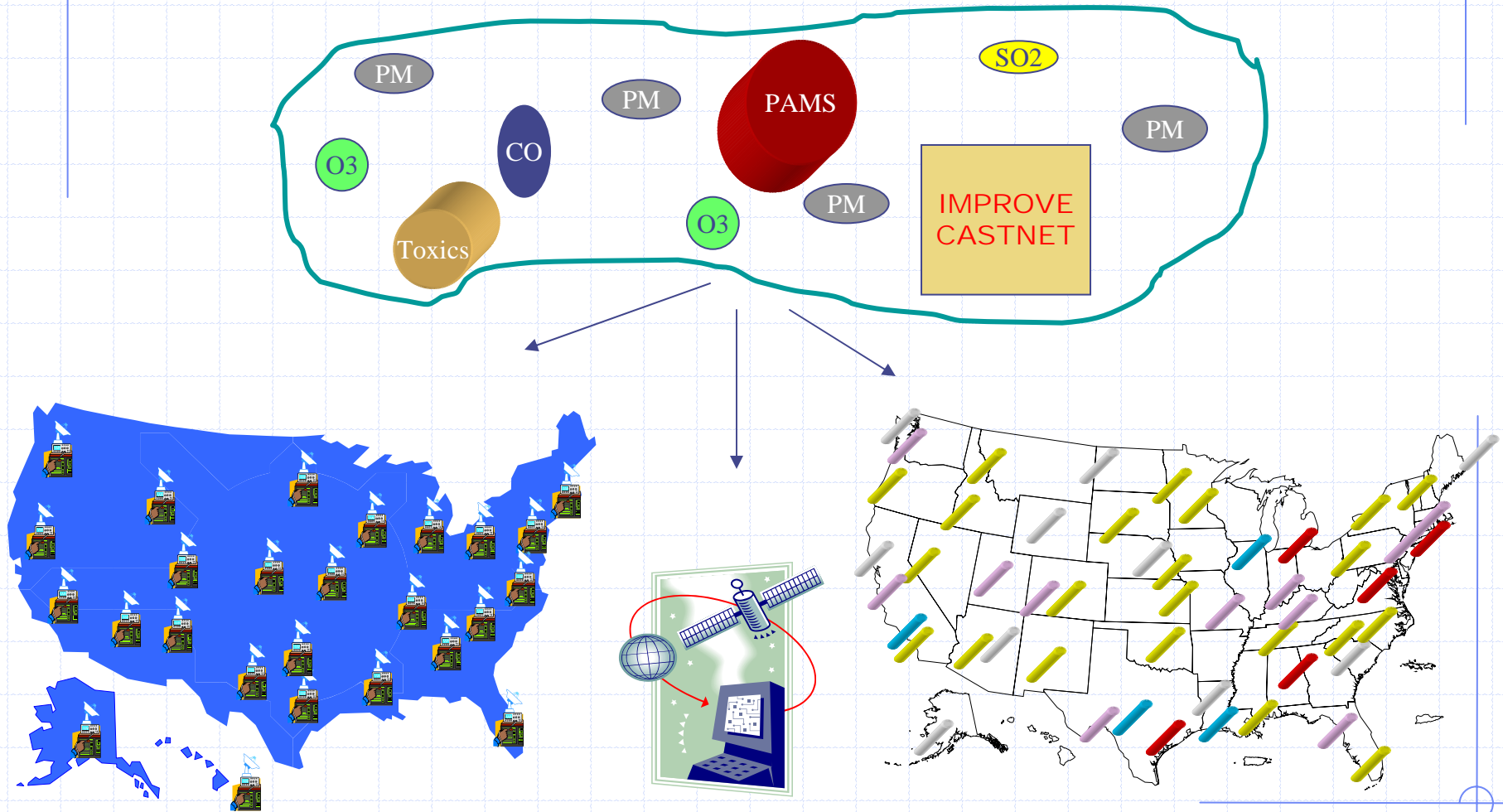
- supercede National results



Divestments invested in priority areas (e.g., air toxics)

National Core Network: **NCORE**

- ◆ Goal: Move from loosely tied single-pollutant networks to coordinated, highly leveraged multi-pollutant networks with real time reporting capability



Principal Data Objectives of NCore

◆ Public Information

- Real-time Input of Data From Across the Country Using Continuous Technologies
- Spatial Mapping (E.G., AIRNOW), Health Advisories

◆ Health/Exposure Assessment Support

- Input for Periodic NAAQS Reviews

◆ Emissions Strategy Planning

(Emphasis on Initial Timeframe)

- What are the best emission reduction approaches?
 - ◆ E.g., Provide for Routine Model Evaluation and Source Attribution

Principal Data Objectives of NCore

◆ Air Quality Trends and Program Accountability

- Does the monitoring confirm strategies are working?
- Major National Initiatives (Acid Rain, Clear Skies, NOx SIPS, FMVCP)
- Including HAPS (National) and Visibility Assessments

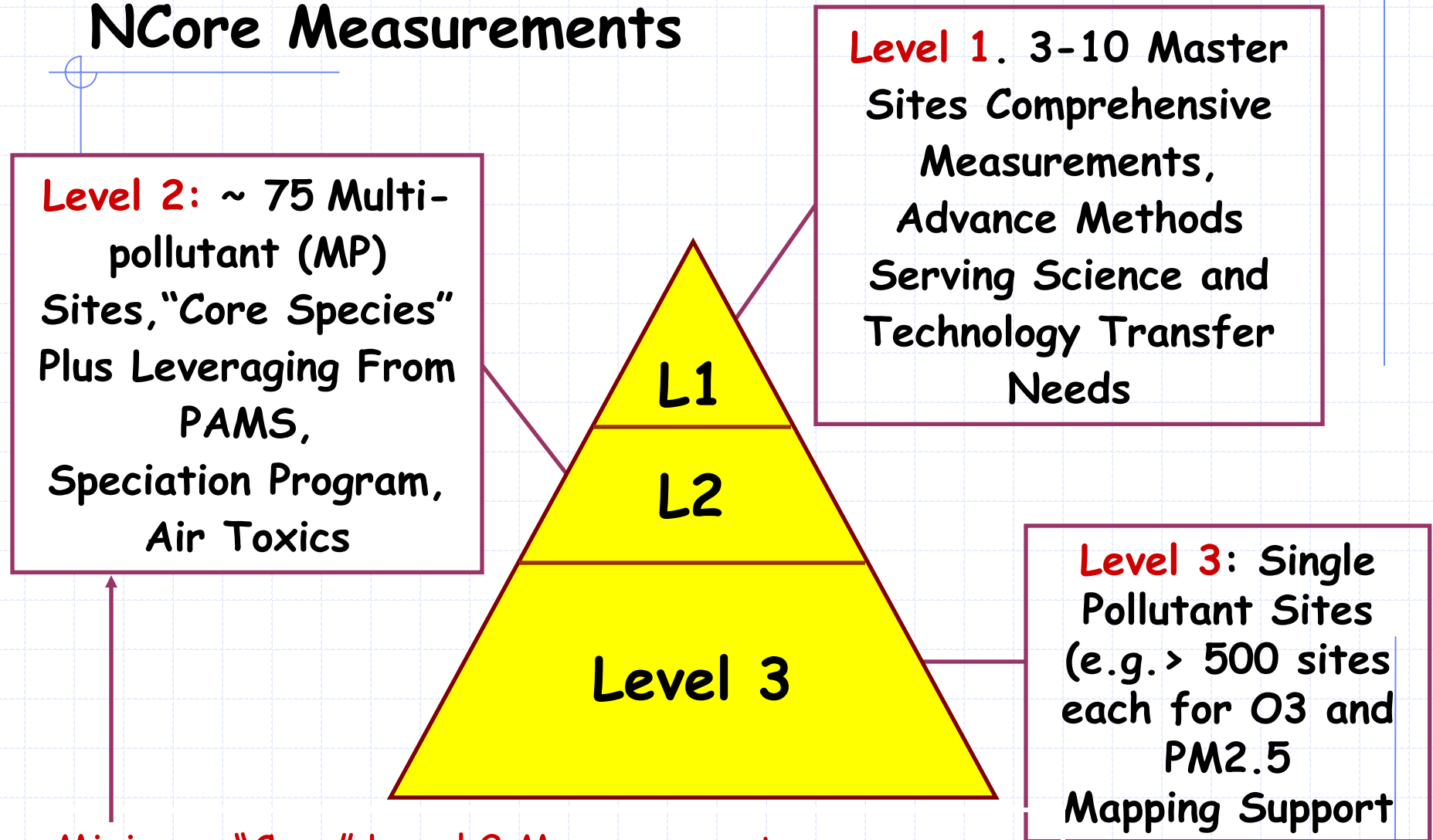
◆ Science Support

- Backbone for More Diagnostic Level Work (Same for Local Sips), Health Studies

◆ NAAQS Determinations and Related Regulatory Rqmts.

- Emphasis on More Pervasive Ozone and PM_{2.5}

NCore Measurements



Minimum "Core" Level 2 Measurements

Continuous N, SO₂, CO, PM_{2.5}, PM₁₀, O₃; PM_{2.5}, HNO₃, NH₃, FRM, Meteorology (T, RH, WS, WD)

NCORE Measurements, cont.

- ◆ Leveraging to obtain multipollutant measurements
 - E.g., new NATTS (air toxics trends) located at PM2.5 chemical speciation (subset located at PAMS)
- ◆ Assume multiple measurements provide a synergistic addition to interpretive value of data sets
- ◆ Key species (even at trace levels)...C,N,S that are of universal importance for atmospheric sciences (model evaluation and SA); health effects/standard setting, and air management...accountability
- ◆ Practical element of technology constraining NCORE2
 - e.g., true NO2, cont. NH3, HNO3
- ◆ NCORE2 is a *proposal*, expecting refinement
- ◆ NCORE1resource issues

NCORE Measurements, cont.

{Hydrocarbon measurements/PAMS}

- ◆ Lacking specific recommendations for routine VOC
 - Implicit assumption covered through PAMS (and toxics)
- ◆ PAMS
 - poor utilization of PAMS data
 - ◆ technology, data analysis resource issues
 - ◆ “too removed” from end product
 - Relative to PM speciation and air toxics data
 - Challenge to NCORE objectives
 - Inadequate attention to nitrogen
 - Recommended changes:
 - ◆ Reduction in required speciated VOC (2 sites per area)
 - ◆ NO_y requirement (more rural locations)
 - ◆ CO required..
 - Consider year round sampling
- ◆ Rural/regional measurements
 - Measurement and programmatic challenges

Proposed Siting Approach - Level 2

◆ "Representative locations"

- 5-15 km urban scale
- 50 km or more...regional scale

"contrast with historical search for highest concentrations...at odds with collocation"

◆ Start With "Reasonable" Coverage From Health/ Exposure Perspective

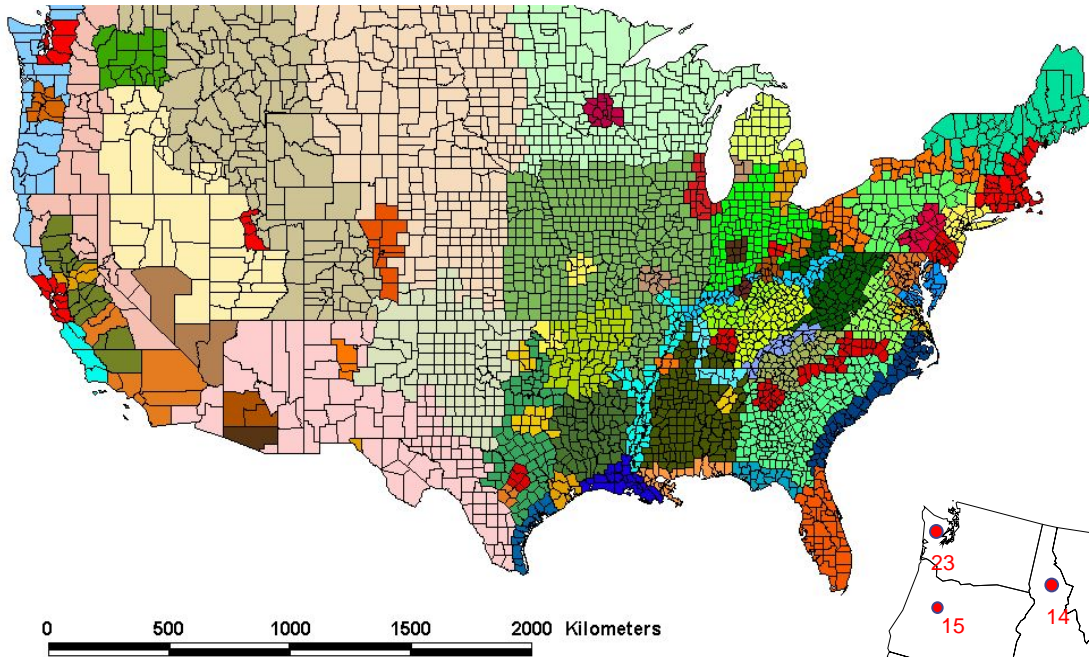
- Population Based (Range of Sizes) With Varying Chemical Composition.
- Assumes Need for *Multiple Pollutants* to Tease Out Confounding Factors

◆ Add in Desired Rural Coverage for Accountability (Major National Programs Such As 3P, NOx SIP) and "Operational" Model Evaluation

◆ Equitable Resource (and Constrained) Considerations

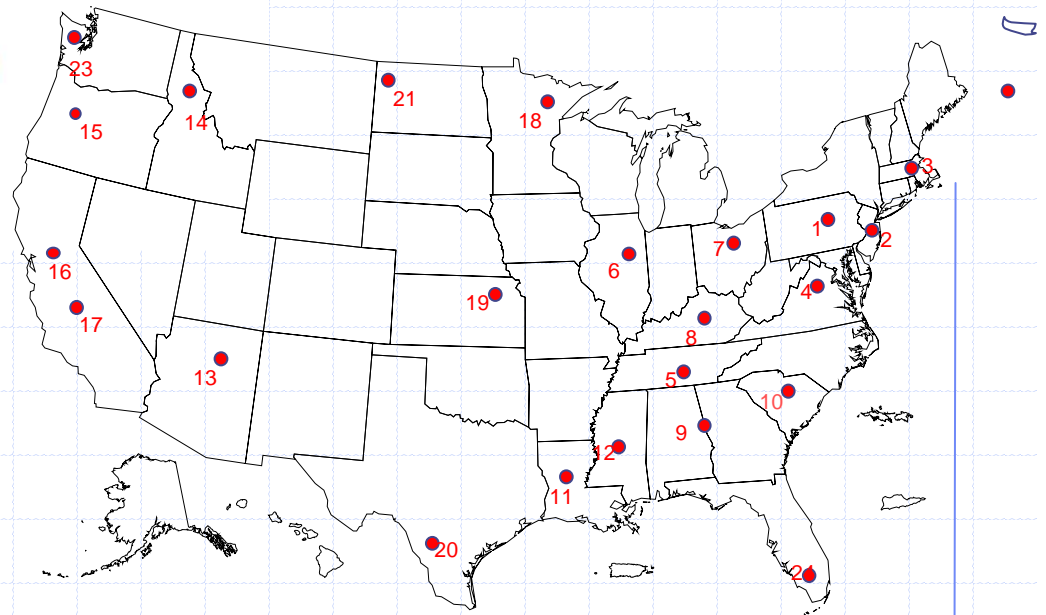
◆ Determine Ability of Existing Networks to Address, Modify Supplemental Information

Proposed Siting Approach - Level 2



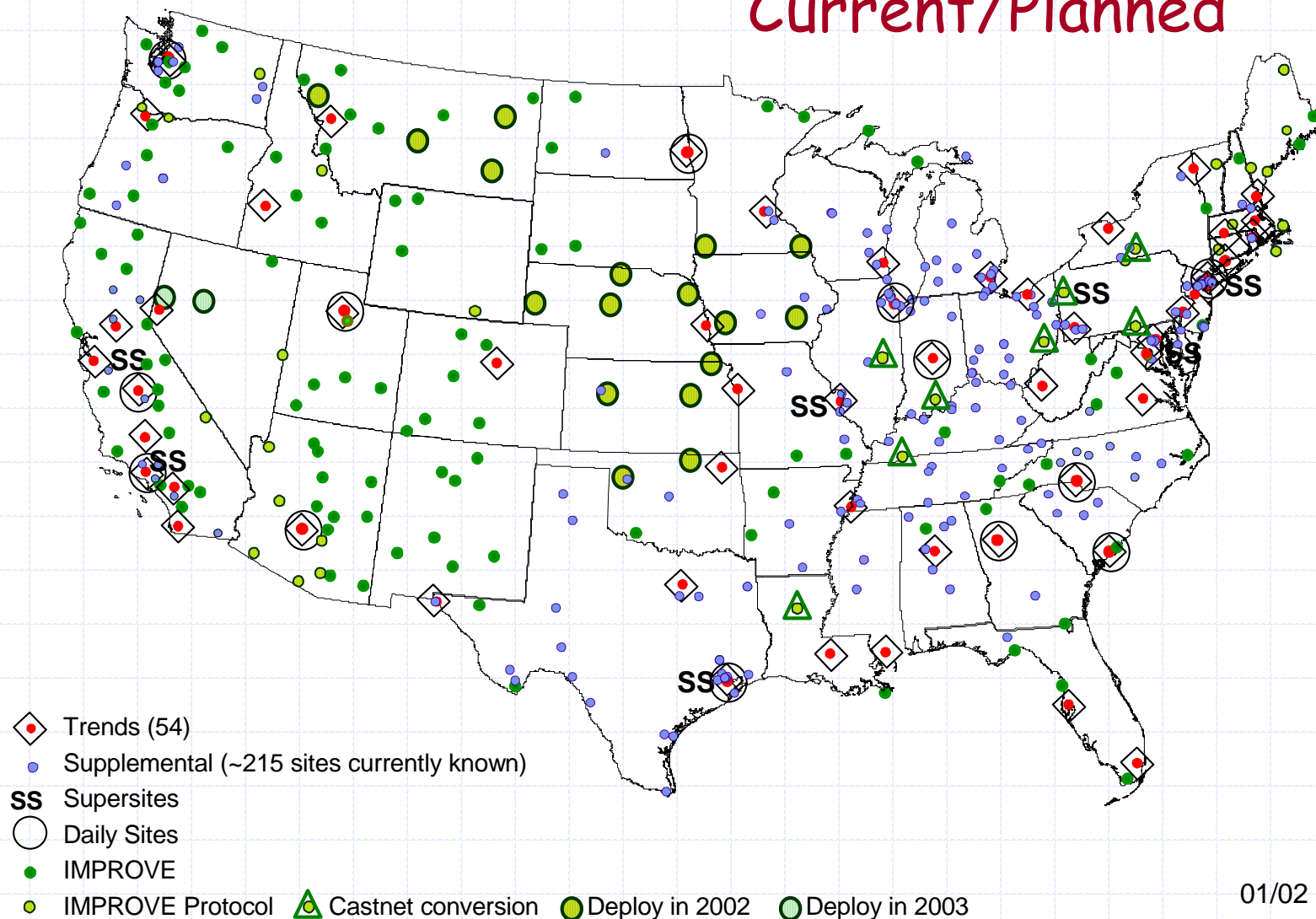
Suggested Rural
Locations for
Level 2 Sites

Transport, Corridor,
Background and
Inflow Locations



Urban & Rural PM2.5 Speciation Networks

Current/Planned



01/02

Supplemental Information

Today

Air Toxic
Monitoring

Visibility -
IMPROVE &
Regional Haze

Ozone -
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Fine Particles -
PM_{2.5}
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Future Directions



Core

Core +
PM spec

Core
Spec
Toxics

Core
PM
Spec
PAMS

Core
Spec
PAMS
Toxics

NCore: Further Integration & Optimization

- ◆ NOAA/NASA Satellite Data
 - Global/Continental transport
- ◆ Other Networks: Deposition, Ecosystems
- ◆ Intensive/diagnostic Field Programs

Longer Term Goal:

- ◆ Integrated Observation-modeling Complex
 - Similar to Meteorological Models (FDDA)
 - ◆ Model Adjustments Through Obs.
 - ◆ All in Near Real Time
 - ◆ Full Delivery of Model Dimensions
 - (Space, Time, Chemistry, Physical Properties)

Recent efforts fostering NCORE implementation

- ◆ Air toxics NATTS (trend sites) at PM2.5 speciation locations
- ◆ Addition of aethalometers to NATTS
- ◆ Joint OAQPS-OAP (within OAR) test program at CASTNET site(s)
- ◆ Additional flexibility in use of STAG (e.g., PM2.5) funds to support more precursor and indicator measurements
- ◆ Ongoing initiative submittals

Communications approach

- ◆ Goal: describe rationale and benefits, reduce misperceptions, and alleviate concerns associated with change
- ◆ STAPPA/ALAPCO and EPA communications experts shaping outreach effort
 - Notification of final draft and comment period through OAQPS director (Sep. 1, 02)
 - Fact sheet.....<http://www.epa.gov/ttn/amtic/>
 - Brochure and newsletter
 - ALA briefing (OCT 02)
 - CASAC review
 - STAPPA/ALAPCO communications team (Ongoing)

Issues



Resources

- No identified \$ for Level 1 sites .. \$2-10M (or >) per year
- Level 2..Modest *initial* capital investment~ \$8-20M
 - ◆ ITT, new instruments (high sensitivity)
- Training
 - ◆ Labor/field orientation to data base/analysis



Network assessments ..removing monitors

- Policy conflicts, e.g.,
 - ◆ Prior agreements...SIPS, NSR, other
 - ◆ Monitor located in designated nonattainment area
 - ◆ Reliance on continuous methods (in place of integrated) for regulatory applications
- Public/community/public health protection perception
 - ◆ DNRMIMBY



Tension associated with balancing between rigorous methods and accommodating new technologies



Generating consensus and progressing ...given variety of interests, stakeholders, and complex infrastructure